MATHEMATICS

MODULE 7
DATA MANAGEMENT

Alberta
EDUCATION
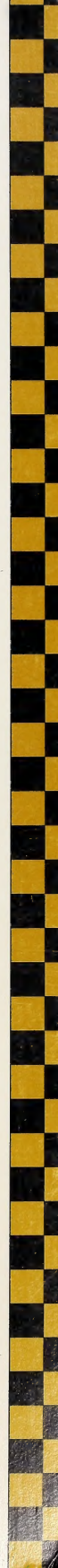
Distance
Learning

STUDENT SUPPORT GUIDE

Mathematics 8

Module 7: Data Management

STUDENT SUPPORT GUIDE

Note

This Mathematics Learning Facilitator's Manual contains answers to teacher-assessed assignments and the final test; therefore, it should be kept secure by the teacher. Student's should not have access to these assignments or the final test until they are assigned in a supervised situation. The answers should be stored securely by the teacher at all times.

Acknowledgements

Mathematics 8
Student Support Guide
Module 7
Data Management
Alberta Distance Learning Centre
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CONTENTS

MODULE INTRODUCTION

What Lies Ahead

In this module introduction the student will learn the importance of learning about statistics. The student will also preview the components of the module.

Gathering Materials

For this section the student will need these items.

Mathematics 8

Module 7

Data
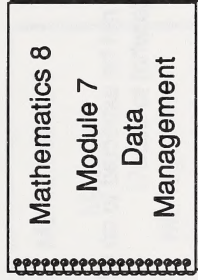
Management

Guiding the Student

- Emphasize to the students that the goal of this module introduction is to preview the module.

- Discuss the learning process, time management, and evaluation with the students. See the suggestions on the next page of this booklet.

The Learning Process

Each section of Module 7 deals with a different skill involving data management.

Sections have several activities.

- Introductory Activities
- Practice Activities
- Extra Practice
- Concluding Activities

Remind the students that they will not be expected to do all the activities. You will help them decide what to do.

Time Management

Decide how long the students will need to complete the module. (The average student should spend about 3 weeks in a 40-week year to complete the module. It is recommended that students spend no more than 1 hour at a time doing mathematics.)

Evaluation

Explain that the grade on Module 7 is based on work in the assignment booklet. The module booklet will help prepare students for the assignment booklet.

GETTING SET

What Lies Ahead

In this section the student will test these skills.
- keeping tallies and making frequency tables
- constructing and interpreting pictographs, bar graphs, line graphs, and circle graphs
- recognizing misleading graphs
- distinguishing between a population and a sample
- recognizing a biased sample

Gathering Materials

For this section the student will needs these items.

geometry set

Mathematics 8
Module 7
Data
Management
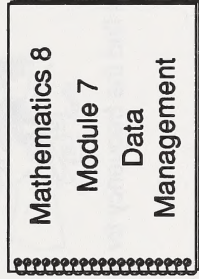
Guiding the Student

- Emphasize to the students that the goal of this section is to identify their strengths and weaknesses.

- Help the students check their answers to the pretest. It is not necessary to correct errors at this time. See the last page of this section for further directions.

Pretest

1. The students in Grade 7C were asked how many teeth fillings they had during their lifetimes.

   They responded as follows:

   3, 4, 5, 8, 2, 0, 6, 7, 4, 4,
   8, 6, 1, 4, 6, 3, 5, 7, 4,
   1, 2, 3, 0, 0, 2, 5, 6, 2, 1,
   0, 4, 3
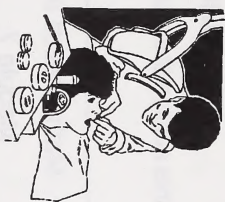
   Complete the following chart and find the frequency for each number of fillings.

Number of Fillings	Tally	Frequency
0	||||	4
1		
2		
3		
4		
5		
6		
7		
8		

Suggested Answers

1.

Number of Fillings	Tally	Frequency
0	||||	4
1	||||	4
2	||||	4
3	||||	4
4	|||| |	6
5	|||	3
6	||||	4
7	||	2
8	||	2

2. Super Charge Vehicles Ltd. are predicting their sales of
    electric cars. The first automobile will be a 4-seater
    Hummalong. With its large battery, it is expected to go 250
    km before the battery needs to be recharged. Recharging
    should only take $1\frac{1}{2}$ hours. The predicted sales are displayed
    in this graph. Study this graph. Then answer the following
    questions.

Predicted Sales of Cars

Legend: Each 🚗 represents 50 cars.
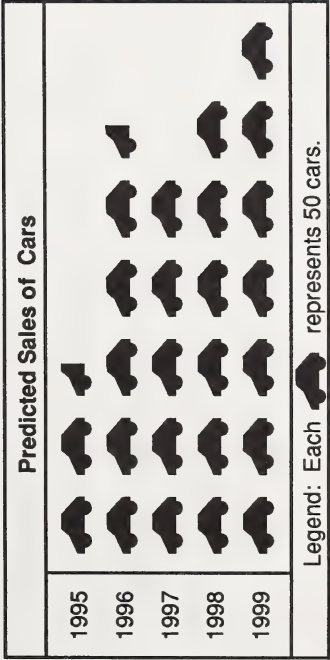
a. How many cars would be represented by 🚗 ?

b. In which year should the production be over
    300 vehicles?

c. If each car sells for $16 000, how much does the
    company expect to earn in 1995?

2. a.   25 cars

    b.   1999

    c. $2 000 000

3. Study the graph below. Then answer the questions on the next page.
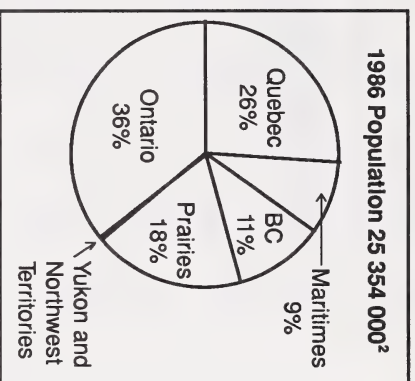
Amount of Gasoline in an Automobile During a Day
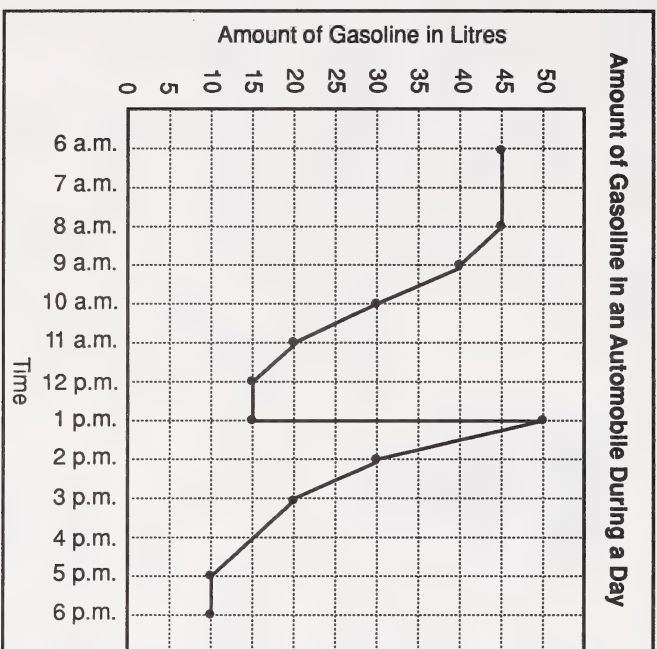
a. When did the driver of the car leave home?

b. When did the driver eat lunch?

c. When did the driver arrive home?

d. What do you think the driver does for a living? Why?

e. When did the driver fill up the gas tank?

f. How much gas did the driver purchase?

g. What is the capacity of the tank?

h. How much gas is left in the tank at 6 p.m.?

3. a. 8 a.m.

    b. 12 p.m. - 1 p.m.

    c. 5 p.m.

    d. The driver is probably a taxi driver or salesperson. The driver is driving most of the day.

    e. 1 p.m.

    f. 35 L

    g. 50 L

    h. 10 L

4. Study these graphs. Then answer the questions on the next page.

1951 Population 14 009 000[1]

Quebec 29%
Maritimes 12%
BC 8%
Prairies 18%
Ontario 33%
Yukon and Northwest Territories

1986 Population 25 354 000[2]

Quebec 26%
Maritimes 9%
BC 11%
Prairies 18%
Ontario 36%
Yukon and Northwest Territories
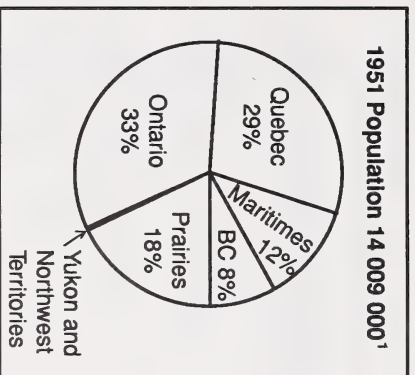
Note

The Yukon and Northwest Territories are included as lines on these graphs because their combined population is less than 1% of the total population of Canada.

[1,2] Statistics Canada.

a. In what regions of the country did the percentage of population increase from 1951 to 1986?

4. a. The population increased in British Columbia and in Ontario from 1951 to 1986.

b. What was the total population of Canada in the following years?

b. (i) In 1951 the population of Canada was 14 009 000.

(i) 1951

(ii) In 1986 the population of Canada was 25 354 000.

(ii) 1986

c. Calculate the population of the Prairies in the following years.

c. (i) 18% of 14 009 000

(i) 1951

     = 0.18 × 14 009 000

     = 2 521 620

In 1951 the population of the Prairies was 2 521 620.

(ii) 1986

(ii) 18% of 25 354 000

     = 0.18 × 25 354 000

     = 4 563 720

In 1986 the population of the Prairies was 4 563 720.

5. Study this graph. Then answer the following questions.

Main Languages Spoken In the World (1987)

Languages

| English |
| French |
| German |
| Hindustani |
| Japanese |
| Chinese |
| Spanish |
| Russian |

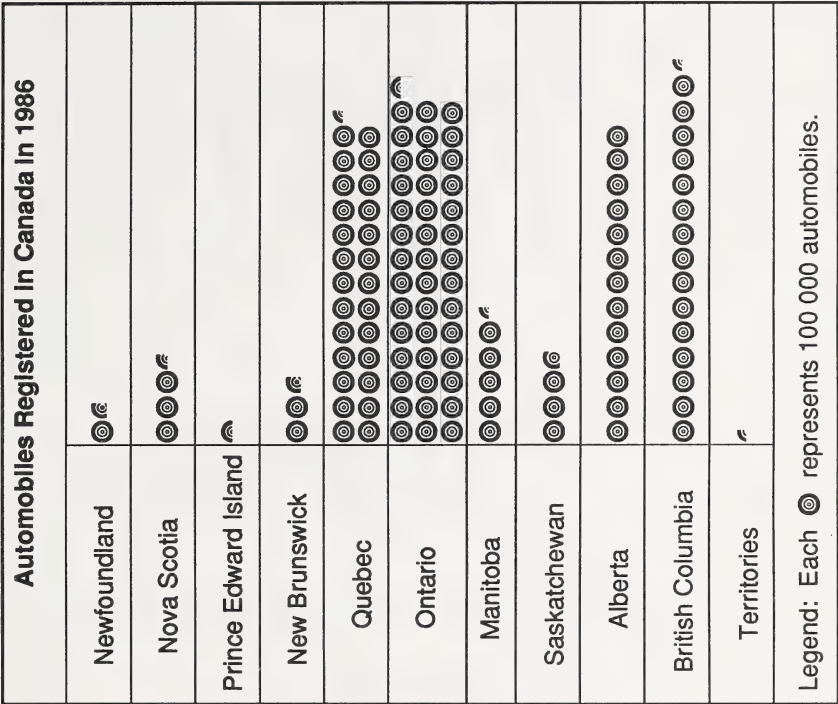0 100 200 300 400 500 600 700 800 900 1000

Number of People (in millions)

a. Which language is spoken by the greatest number of people?

b. About how many people speak English?

c. About how many people speak French?

5. a. Chinese

    b. 400 000 000

    c. 100 000 000

6. Make a pictograph to represent this data.[1]

Automobiles Registered In Canada In 1986	
Province	**Number**
Newfoundland	176 000
Nova Scotia	337 000
Prince Edward Island	56 000
New Brunswick	286 000
Quebec	2 614 000
Ontario	4 244 000
Manitoba	527 000
Saskatchewan	389 000
Alberta	1 296 000
British Columbia	1 527 000
Territories	25 000

6.

Automobiles Registered In Canada In 1986	
Newfoundland	◎◎
Nova Scotia	◎◎◎
Prince Edward Island	◎
New Brunswick	◎◎◎
Quebec	◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎
Ontario	◎◎
Manitoba	◎◎◎◎◎
Saskatchewan	◎◎◎◎
Alberta	◎◎◎◎◎◎◎◎◎◎◎◎◎
British Columbia	◎◎◎◎◎◎◎◎◎◎◎◎◎◎◎
Territories	◎
Legend: Each ◎ represents 100 000 automobiles.	

[1] Statistics Canada.

7.   Make a bar graph to represent this data. [1]

The Longest Rivers In Canada	
River	**Length**
Mackenzie	4 241 km
Yukon	3 185 km
St. Lawrence	3 058 km
Nelson	2 575 km
Columbia	2 000 km
Saskatchewan	1 939 km
Peace	1 923 km
Churchill	1 609 km
South Saskatchewan	1 392 km
Fraser	1 370 km
North Saskatchewan	1 287 km
Ottawa	1 271 km

The Longest Rivers in Canada

Length in Kilometres
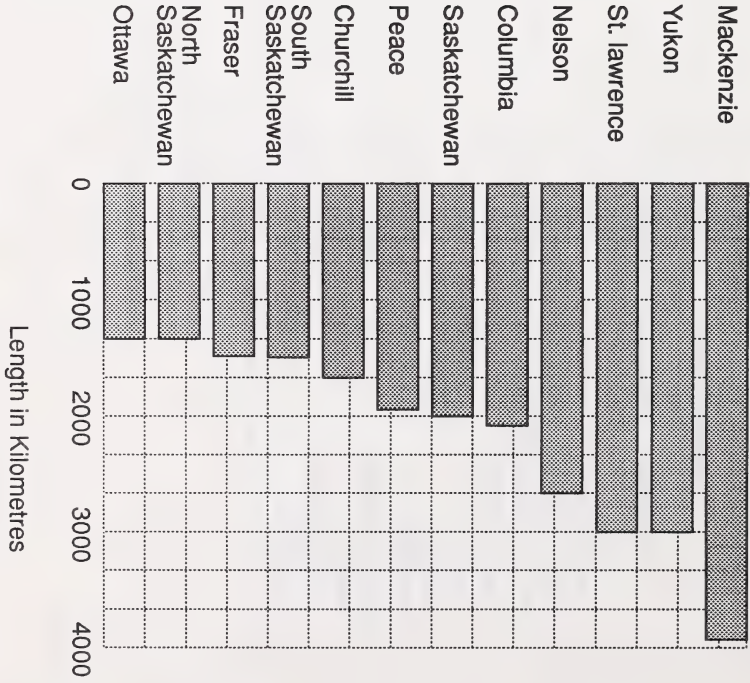
8. Teresa's parents kept a baby book and recorded her height
    at birth and on every birthday.

8.

Theresa's Growth

Age (a)	Height (cm)
birth	51
1	76
2	86
3	94
4	101
5	104
6	115
7	119
8	130
9	135
10	141

Teresa's Growth Over Her First 10 Years

Make a line graph to display this data.

Note

The metric symbol for years is a.
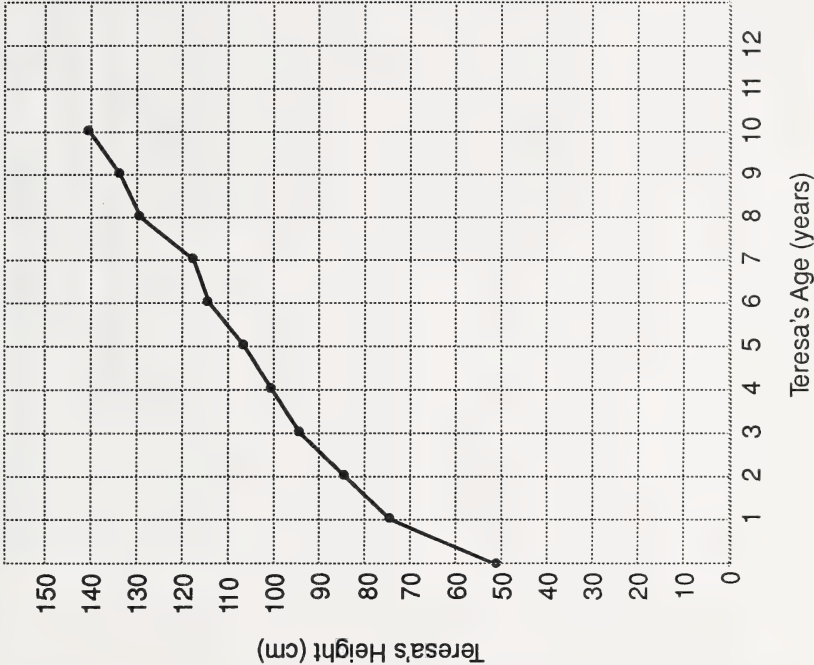
9. Make a circle graph to display this data.

Money Raised by Student Council	
Student Cards	$12 000
Canteen	$6 000
Dances	$2 000
Athletics	$10 000
Fund raiser	$10 000
Total	$40 000

9. Total   12 000 + 6 000 + 3 000 + 10 000 + 9 000
              = 40 000

Student Cards 12 000 + 40 000 = 0.3 = 30%
                        30% of 360°
                        = 0.3 × 360
                        = 108°

Canteen   6 000 + 40 000 = 0.15 =15%
                        15% of 360°
                        = 0.15 × 360
                        = 54°

Dances   2 000 + 40 000 = 0.05 = 5%
                        5% of 360°
                        = 0.05 × 360
                        = 18°

Fund Raisers/ 10 000 + 40 000 = 0.25 = 25%
Athletics   25% of 360°
                        = 0.25 × 360
                        = 90°

Student Council Income
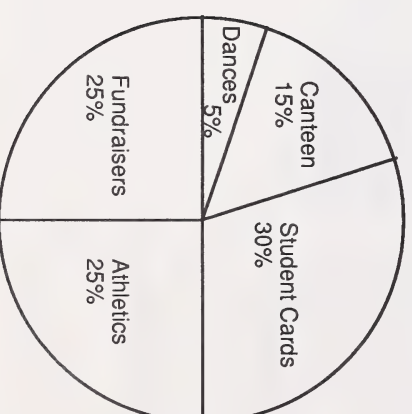
10. Explain why each of the following graphs is misleading.

a.

Compact Disc Sales In June

478   512   1500   2102   4289

Jazz	Classical	Easy Listening	Country	Rock
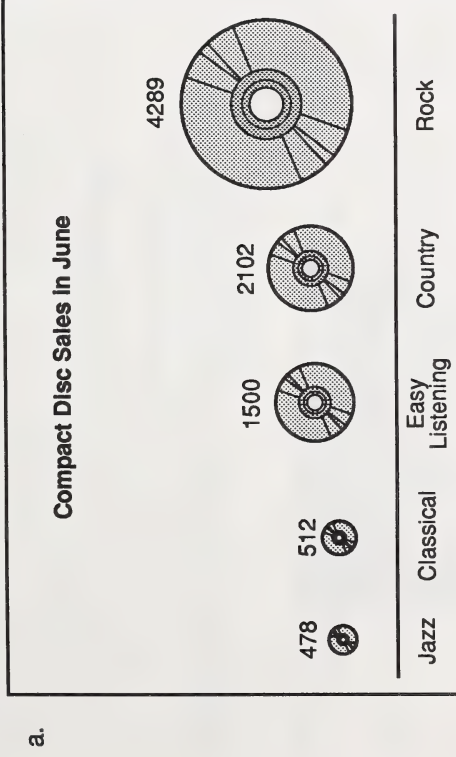
10. a. Instead of using a picture of a disk to represent 500 sales, different-sized pictures are used. This is misleading. For example, about three times as many easy listening compact discs as jazz discs were sold in June. But the picture representing easy listening is three times as wide and three times as high as the picture representing jazz. The area of the easy listening picture has nine times the area as the jazz disc, so it is out of proportion.

b.

Profits Soar

Profits

8500
8400
8300
8200
8100

J   F   M   A   M   J

Months
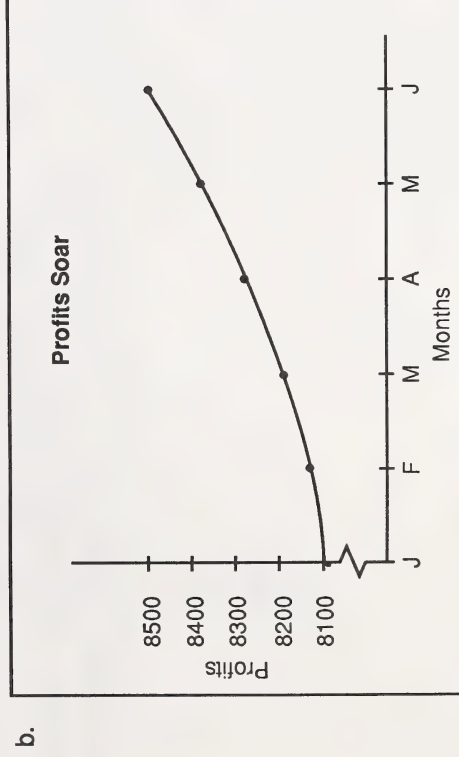
b. Instead of letting each unit on the vertical scale represent $1 700, a broken scale is used. This broken scale causes the graph to have a steeper slope and give the appearance that profits are rising more quickly. This is misleading.

11. Define the following terms used in statistics.

     a.   population

     b.   census

     c.   sample

     d.   biased sample

     e.   random sample

12. a.   Yvonne wants to discover how many people in her town
          can swim. Explain how she could conduct a census to
          determine this.

     b.   Explain how Yvonne could use sampling to estimate the
          number of people who can swim in her town.

11. a.   A population is an entire set or group from which data is
          collected.

     b.   A census is a count or measure of a property of a
          population.

     c.   A sample is a part of a population.

     d.   A biased sample is a sample that is not representative of
          a whole population.

     e.   A random sample is a sample selected so that each
          member has an equal chance of being chosen.

12. a.   Yvonne could visit every household in the town and
          question each family.

     b.   Yvonne could get a list of the addresses of all the
          houses and apartments from the town office. Then she
          could select 10% in a random way. She could then visit
          these sample households and question each family.

13. Max wants to discover how far from school the students at his school live. Which sampling technique would produce more accurate results? Why?

- Max asks every third student who gets off the school bus, "How far from school do you live?"

- Max asks every fifth child entering the school, "How far from school do you live?"
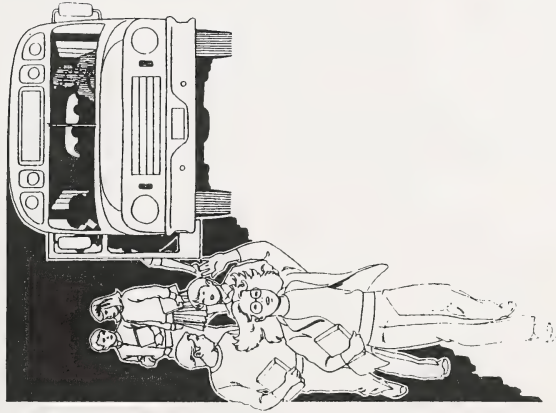
13. The second technique is better. The first technique would not give a representative sample of the population. The children getting off the school bus probably live farther away.

14. There are 592 people who have library cards at Cumberland library. Rachel decides to mail a questionnaire to card holders to ask their opinion about purchasing more foreign language books. Which sampling technique would produce more accurate results? Why?

- Mail questionnaires to five card holders whose names are selected at random from a list.

- Mail questionnaires to 60 card holders whose names are selected at random from a list.

14. The second technique would produce more accurate results because about 10% of the population would be polled. The first technique uses too small a sample. The people polled may not be representative of the entire population.

Guiding the Student

Help each student to decide what to do next. It is recommended that students review the notes of the sections which corresponds to the questions with which the students experienced success, and that the students do a few sample questions from the activities.

It is recommended that students carefully study the notes in the sections which correspond to the questions with which the students experienced difficulty, and that the students do most of the questions in the activities.

Question	Skill	Section
1.	keeping tallies and making frequency tables	2
2.	interpreting pictographs	2
3.	interpreting line graphs	4
4.	interpreting circle graphs	5
5.	interpreting bar graphs	3
6.	making a pictograph	2
7.	making a bar graph	3
8.	making a line graph	4
9.	making a circle graph	5
10.	recognizing misleading graphs	6
11.	understanding terms	7
12.	distinguishing between a census and a sample	7
13., 14.	recognizing biased samples	7

PICTOGRAPHS

What Lies Ahead

In this section the student will learn these skills.
- interpreting pictographs
- constructing pictographs

Gathering Materials
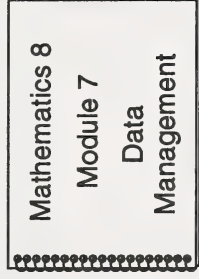
For this section the student will need these items.

Mathematics 8
Module 7
Data
Management

geometry set

Guiding the Student

- Emphasize to the students the goal of this section.

- Help the students decide what to do in this section.

- Help the students check their answers to the activities in this section and correct any errors.

Introductory Activities

Suggested Answers

1. Use the pictograph to answer the following questions.

Stanley Cup Winners (1959 - 1990)	
Montreal Canadiens	▽ ▽ ▽ ▽ ▽ ▽ ▽ ▽ ▽ ▽
Chicago Blackhawks	▽
Toronto Maple Leafs	▽ ▽ ▽ ▽
Boston Bruins	▽ ▽
Philadelphia Flyers	▽ ▽
New York Islanders	▽ ▽ ▽ ▽
Edmonton Oilers	▽ ▽ ▽ ▽ ▽
Calgary Flames	▽

Legend: Each ▽ represents 1 Stanley Cup.
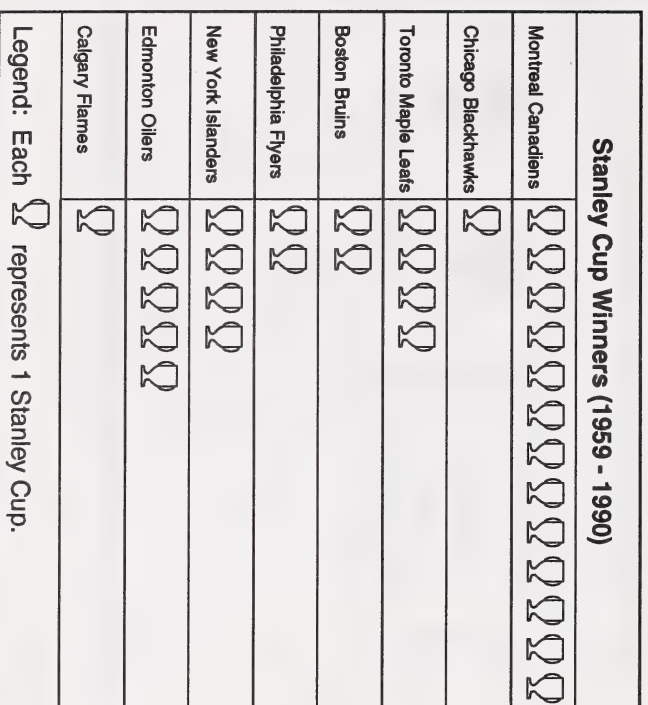
a. Which hockey team won the most Stanley Cups from 1959 - 1990?

b. How many Stanley Cups did the Edmonton Oilers win from 1959 - 1990?

c. How many Stanley Cups did the Calgary Flames win from 1959 - 1990?

1. a. Montreal Canadiens

    b. 5

    c. 1

2. Use this pictograph to answer the following questions.

Number of Passengers at Canada's Busiest Airports (1985)[1]	
Toronto	✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗ ✗
Montreal (Dorval)	✗ ✗ ✗ ✗ ✗ ⸮
Vancouver	✗ ✗ ✗ ✗ ✗ ✗ ⸮
Calgary	✗ ✗ ✗
Winnipeg	✗ ✗
Legend: Each ✗ represents 100 000 passengers.	
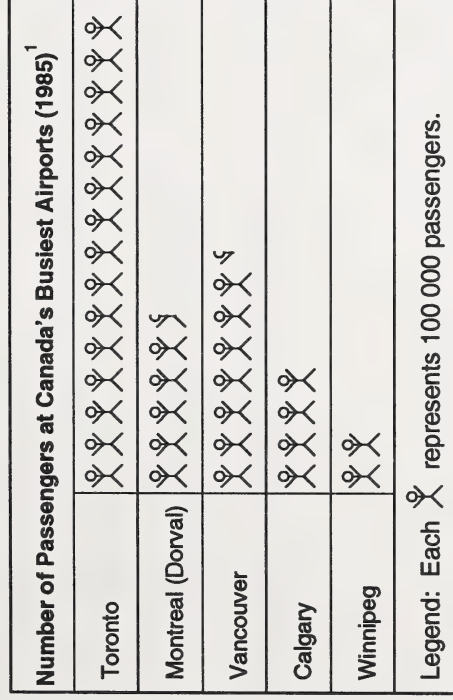
a. Which airport was the busiest in Canada in 1985?

b. Did the Vancouver airport handle more passengers than the Montreal (Dorval) airport in 1985?

c. How many more passengers were handled in Vancouver than in Calgary in 1985?

2. a. Toronto

    b. Yes

    c. about 325 000 passengers

---
[1] Statistics Canada.

3. Use the pictograph to answer the questions on the next page.

Number of Cars Sold by Big City Auto Sales (1991)

Month	Cars
Jan.	🚗🚗🚗
Feb.	🚗🚗🚗
Mar.	🚗🚗🚗🚗
Apr.	🚗🚗🚗🚗
May	🚗🚗🚗🚗🚗
June	🚗🚗🚗🚗🚗🚗🚗
July	🚗🚗🚗🚗🚗🚗🚗🚗
Aug.	🚗🚗🚗🚗🚗🚗🚗🚗
Sept.	🚗🚗🚗🚗🚗
Oct.	🚗🚗🚗🚗🚗
Nov.	🚗🚗🚗🚗🚗
Dec.	🚗🚗

Legend: Each 🚗 represents 10 cars sold.

a.   How many cars were sold in these months?

   (i)   August, 1991

   (ii)   December, 1991

b.   How many more cars were sold in June, 1991 than in January, 1991?

c.   If each car was sold for $12 000, how much money was brought into the business in April, 1991?

d.   Does this pictograph tell you clearly which were the best and worst months in 1991 for car sales?

3.   a.   (i)   75 cars

        (ii)   20 cars

   b.   about 32 more cars

   c.   about $540 000

   d.   yes

4.   Use the pictograph to answer the questions on the next page.

Longest-Running Canadian TV Shows (up to end of 1987-1988 season)[1]

Show	Seasons
Hockey Night in Canada	📺📺📺📺📺📺📺📺📺
CFL Football	📺📺📺📺📺📺📺📺
Country Canada/Country Calendar	📺📺📺📺📺📺📺📺
Front Page Challenge	📺📺📺📺📺📺📺▱
The Nature of Things	📺📺📺📺📺📺📺▱
The Friendly Giant	📺📺📺📺📺📺▱
Hymn Sing	📺📺📺📺📺▱
The Tommy Hunter Show	📺📺📺📺📺
Wide World of Sports	📺📺📺📺📺
W-5	📺📺📺📺▱

Legend: Each 📺 represents 4 seasons.

[1] Statistics Canada.

How many seasons had the following shows run up to the end of 1987-1988 season?

a. Hockey Night in Canada

b. Front Page Challenge

c. W-5

4. a. 36 seasons

    b. 31 seasons

    c. 22 seasons

Practice Activities

These were the top money-making films up to 1987.

Film	Total Rental
E.T. The Extra Terrestrial (1982)	$227 960 804
Star Wars (1977)	$193 500 000
Return of the Jedi (1983)	$168 002 414
The Empire Strikes Back (1980)	$141 600 000
Jaws (1975)	$129 961 081

Construct a pictogram to display this data. Use 🎥 to represent
$30 000 000.

Suggested Answers

Earnings of Films up to 1987

E.T. The Extra Terrestrial	🎥🎥🎥🎥🎥🎥🎥◖
Star Wars	🎥🎥🎥🎥🎥🎥◖
Return of the Jedi	🎥🎥🎥🎥🎥◖
The Empire Strikes Back	🎥🎥🎥🎥◖
Jaws	🎥🎥🎥🎥◖

Legend: Each 🎥 represents $30 000 000.

BAR GRAPHS

Gathering Materials

For this section the student will need these items.

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What Lies Ahead

In this section the student will learn these skills.

- interpreting bar graphs
- constructing a bar graph

Guiding the Student
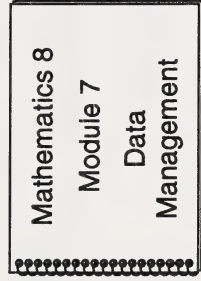
- Help the students check their answers to the activities in this section and correct any errors.

- Emphasize to the students the goal of this section.

- Help the students decide what to do in this section.

Introductory Activities

Suggested Answers

1. Use the bar graph to answer the following questions.

Lengths of Famous Rivers

Rivers

Length (km)

a. How long is the Amazon River?

b. How long is the Nile River?

c. How long is the Peace River?

1. a. about 6 300 km

   b. about 6 500 km

   c. about 1 800 km

2. Use the graph to answer the following questions.

Population of Canada's Largest Cities *(1986) [1]

(*includes neighbouring areas from which major centre draws its work force)
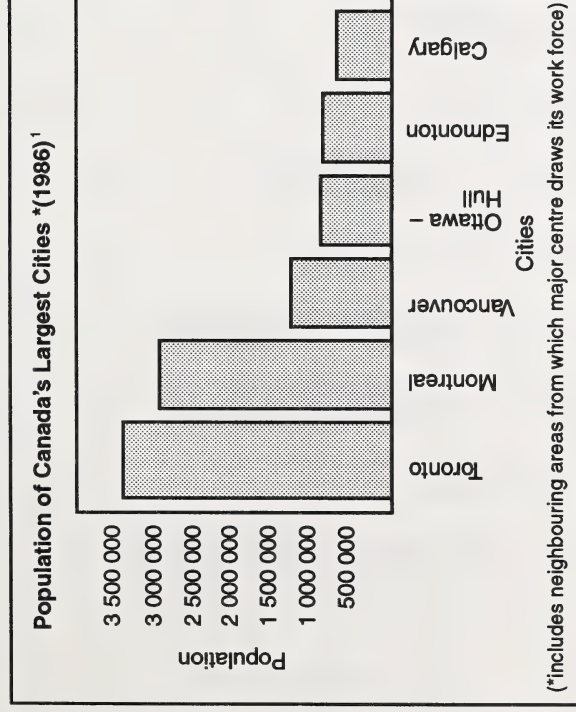
a. How many people lived in Calgary in 1986?

b. How many people lived in Montreal in 1986?

c. How many people lived in Vancouver in 1986?

2. a. about 600 000 people

   b. about 2 900 000 people

   c. about 1 250 000 people

---

[1] Statistics Canada.

3. Use the graph to answer the following questions.

Average Single-family Housing Price[1]
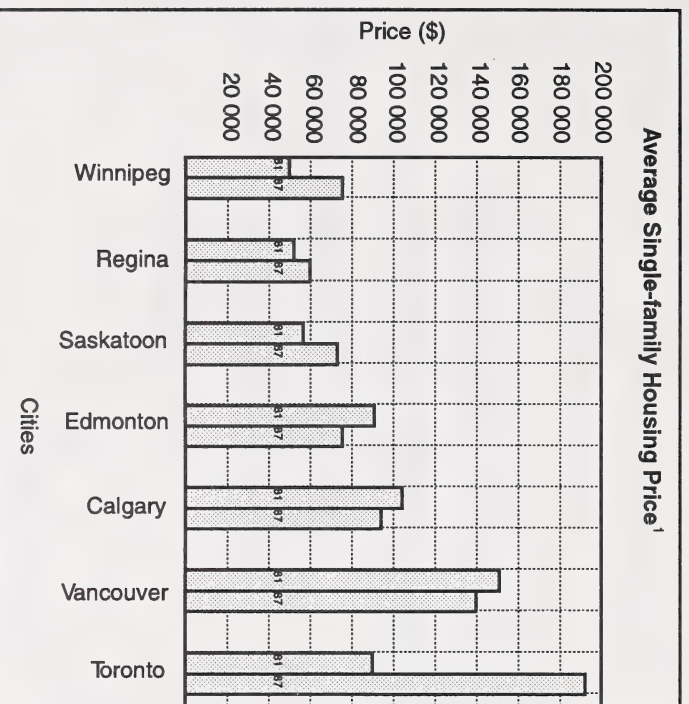
a. In which city did houses cost the most in 1981? In 1987?

b. By how much did house prices increase in Vancouver between 1981 and 1987?

3. a. Vancouver in 1981, Toronto in 1987

  b. about $100 000

4. Use the graph to answer the questions on the next page.

Ice Hockey Medal Winners (1924 - 1984)
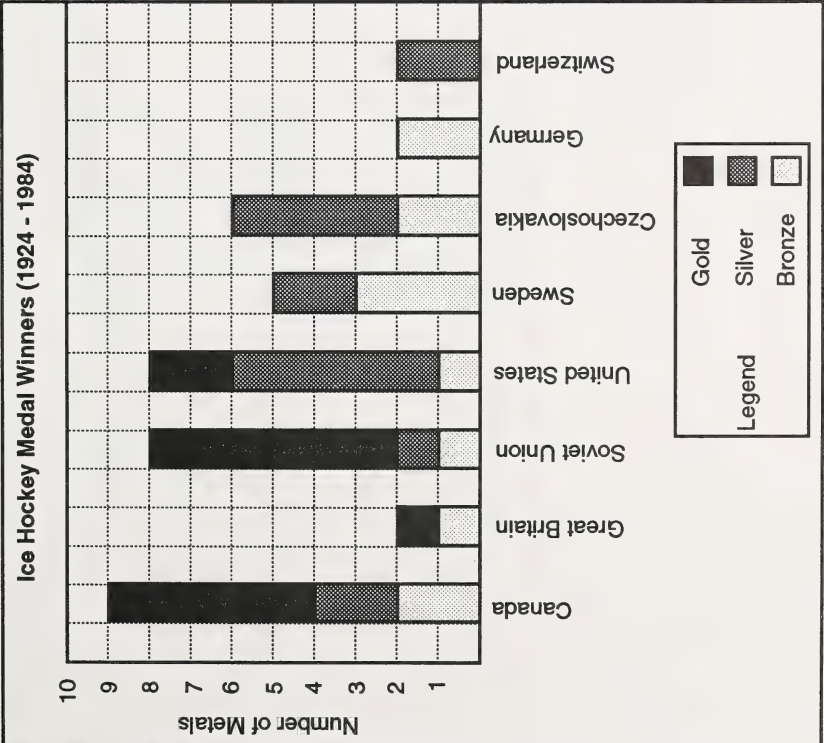
a. Which country won the most ice hockey medals from 1924 to 1984?

4. a. Canada

b. The Soviet Union and United States won the same number of ice hockey medals from 1924 to 1984. Which of these countries won the most gold medals?

b. The Soviet Union

c. Which countries have won gold medals in ice hockey during the period?

c. Canada, Great Britain, the Soviet Union, and the United States

d. How many gold medals in ice hockey did Canada win during the period?

d. 5

Practice Activities

Construct a bar graph to display the following data.

Population by Continents (1988)	
Asia	3 031 100 000
Europe	684 800 000
Africa	615 300 000
Australia	25 500 000
North America	413 100 000
South America	282 200 000

Suggested Answers

Population of Continents
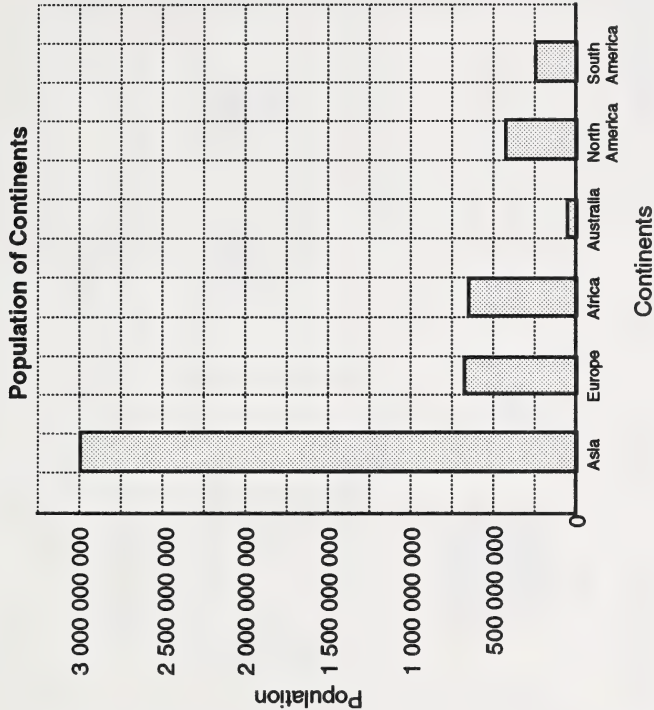
LINE GRAPHS

What Lies Ahead

In this section the student will learn these skills.

• interpreting a line graph

• drawing a line graph

Gathering Materials
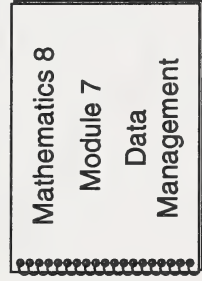
For this section the student will need these items.

Mathematics 8
Module 7
Data
Management

geometry set

Pre-Algebra disk of Computer Drill and Instruction: Mathematics, Level D (SRA)

(optional)

Guiding the Student

• Emphasize to the students the goal of this section.

• Help the students decide what to do in this section.

• Help the students check their answers to the activities in this section and correct any errors.

Introductory Activities

Suggested Answers

1. Use the graph to answer the questions on the following page.

A Plane Takes Off

Speed (kilometres per hour)

Point of Lift-off

Time from Starting (seconds)
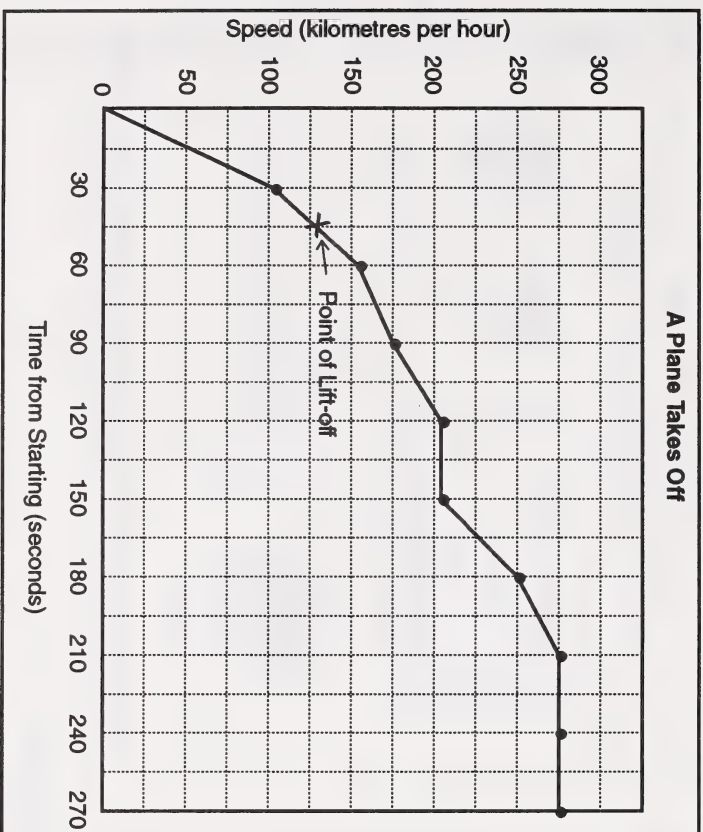
a. When did the plane lift off?

1. a. 45 seconds

b. How fast was the plane travelling when it lifted off?

b. 125 km/h

c. Did it change its speed between 2 minutes and $2\frac{1}{2}$ minutes?

c. no

d. What was the highest speed attained by the aircraft?

d. 275 km/h

2.   Use the graph below to answer the following questions.

Telephone Exchange Busy Times
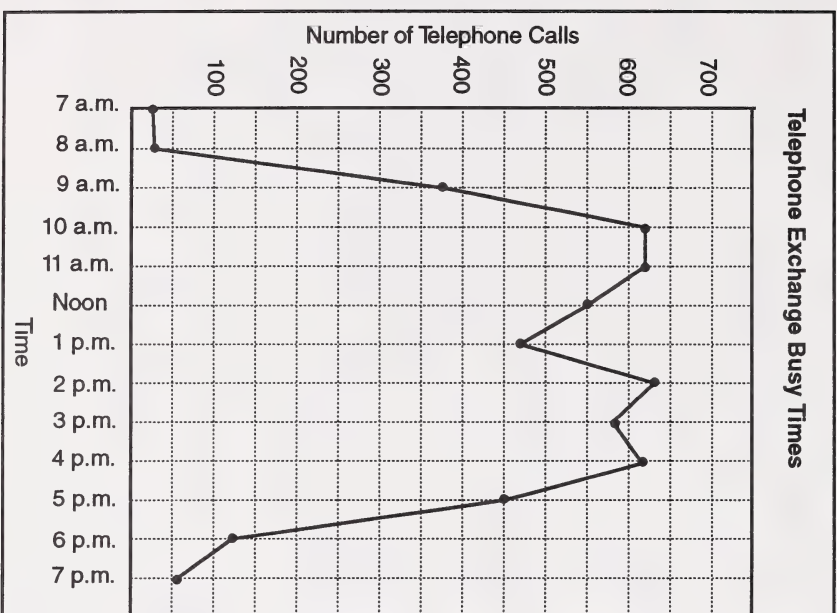
a.   Between what hours were there more than 500 calls going through the exchange?

b.   Try to explain why most calls are made between 9 a.m. and 5 p.m.

c.   Why would there be a drop-off in calls between noon and 1:00 p.m.?

2.   a.   between 9:30 a.m. and 12:30 p.m., and between 1:15 p.m. and 4:45 p.m.

     b.   These are business hours.

     c.   This is noon hour.

3. Use the graph to answer the questions on the next page.

Average Single-family Housing Price[1]

Cost ($)

	Toronto
--- ---	Vancouver
·······	Edmonton

Years: 1985, 1986, 1987

Cost scale: 60 000, 80 000, 100 000, 120 000, 140 000, 160 000, 180 000
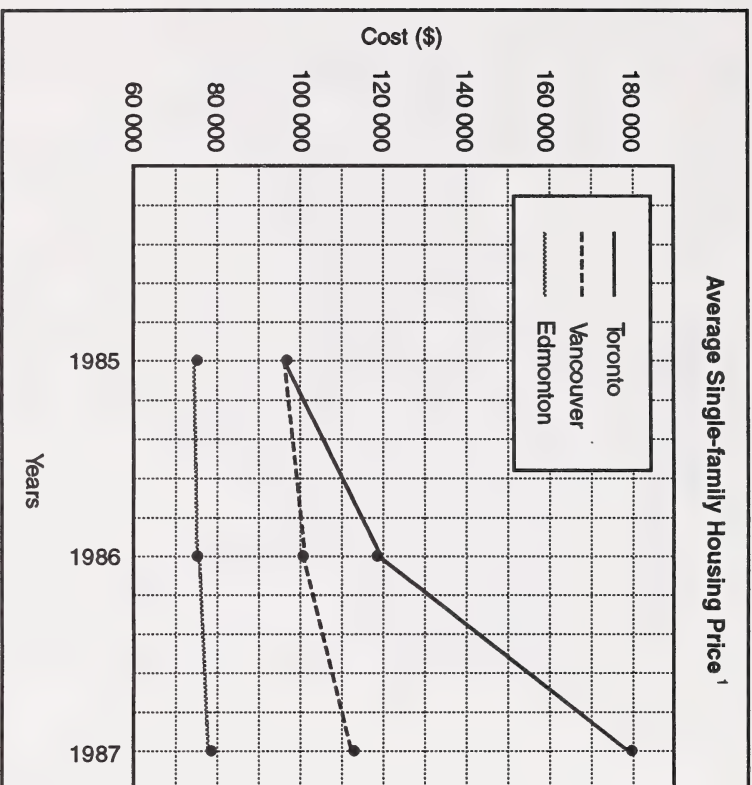
a. In which of these cities did the houses cost the most in 1987?

3. a. Toronto

b. In which of these cities did the houses cost the least in 1987?

b. Edmonton

c. In which of these cities did the price of houses change the least from 1985 to 1987?

c. Edmonton

Practice Activities

1. Below is data from McCarthy's Sporting Goods Store.
   Construct a line graph to display the data.

Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Sales of Skis	39	23	10	5	4	2	4	4	10	48	50	77
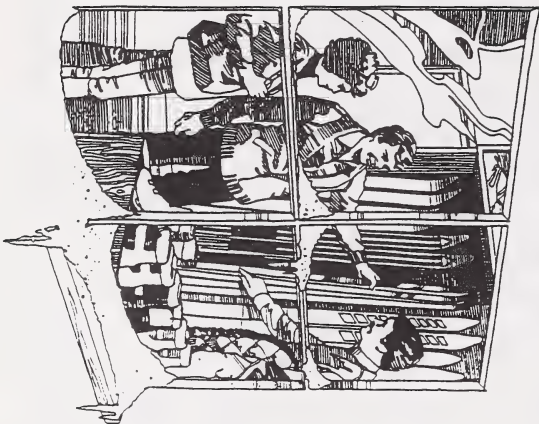
Suggested Answers

1. **Sales of Skis at McCarthy's Sporting Goods Store**
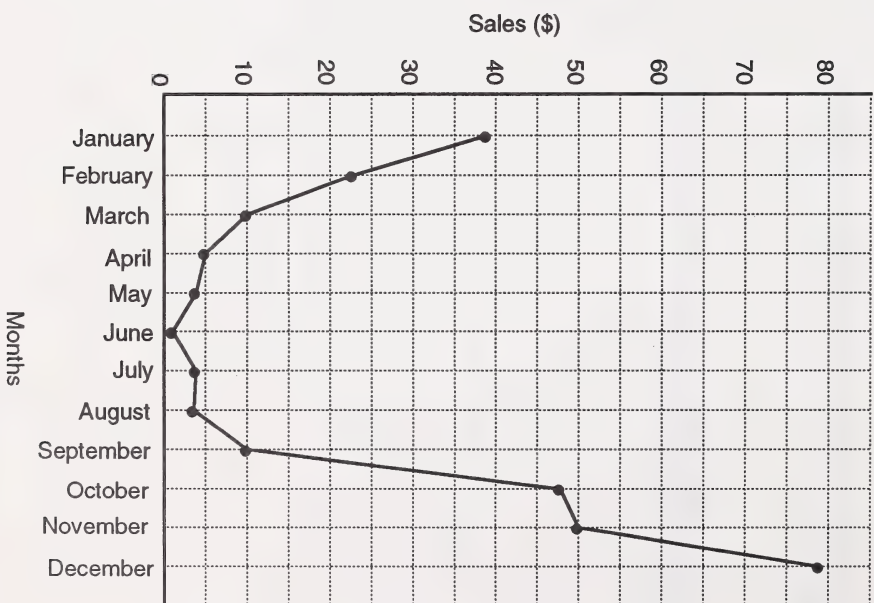
2. For a science fair Susan decided to see which kind of logs
    burned the hottest and longest. She burned three logs of the
    same weight. One log was poplar, one was tamarack, and
    one was birch. She placed a thermometer in front of the
    fireplace and took readings every 5 minutes. Here are the
    results.

POPLAR		TAMARACK		BIRCH	
Time	Temp.	Time	Temp.	Time	Temp.
0	20	0	20	0	20
5	24	5	23	5	22
10	27	10	27	10	27
15	28	15	27	15	28
20	34	20	28	20	30
25	35	25	30	25	35
30	35	30	32	30	35
35	34	35	34	35	38
40	30	40	34	40	40
45	28	45	30	45	40
50	26	50	30	50	40
55	25	55	27	55	38

Display this information on a line graph. Use different colours
to represent the three kinds of wood.

2.

Burning Logs

poplar
tamarack
birch

Temperature (°C)

Time (min)
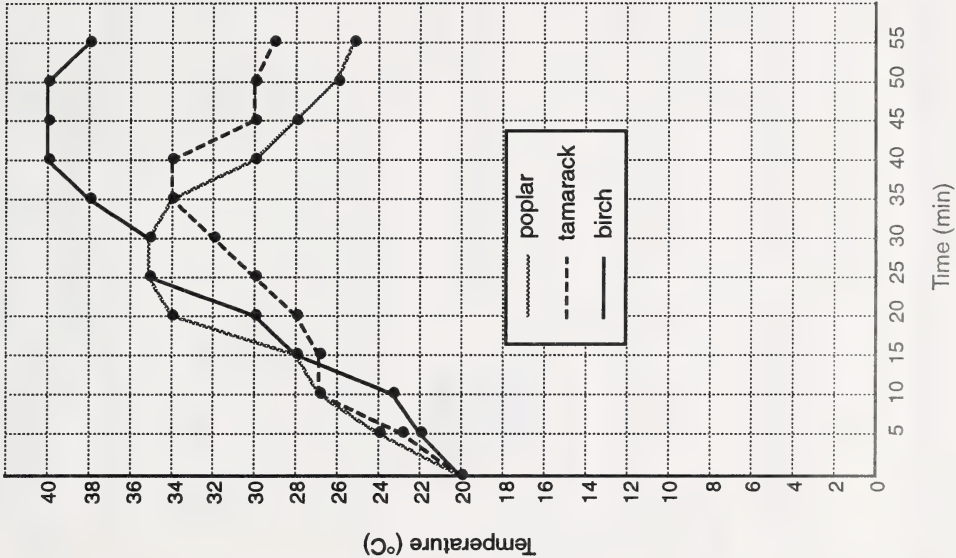
Computer Alternative

3. If you require further practice plotting a point, do Lessons 18 and 19 on the *Pre-Algebra disk* of *Computer Drill and Instruction: Mathematics, Level D* (SRA)

3. Computer corrected

CIRCLE GRAPHS

What Lies Ahead

In this section the student will learn these skills.
- interpreting circle graphs
- drawing circle graphs

Gathering Materials

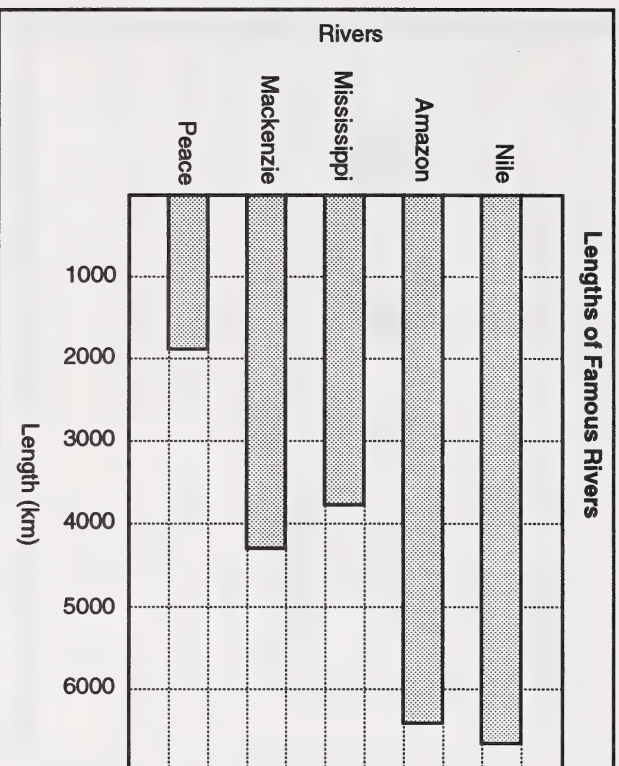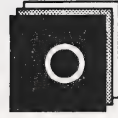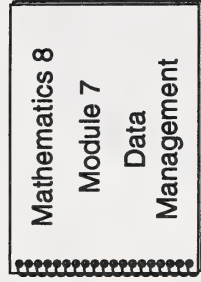For this section the student will need these items.

Mathematics 8
Module 7
Data
Management

Pie Graphics on *Disk C* of *MAC 7*
(Houghton Mifflin)

(optional)

Guiding the Student

- Help the students check their answers to the activities in this section and correct any errors.

- Emphasize to the students the goal of this section.

- Help the students decide what to do in this section.

Introductory Activities   **Suggested Answers**

1. Look at the circle graph and then answer the following
    questions.

Local Garbage
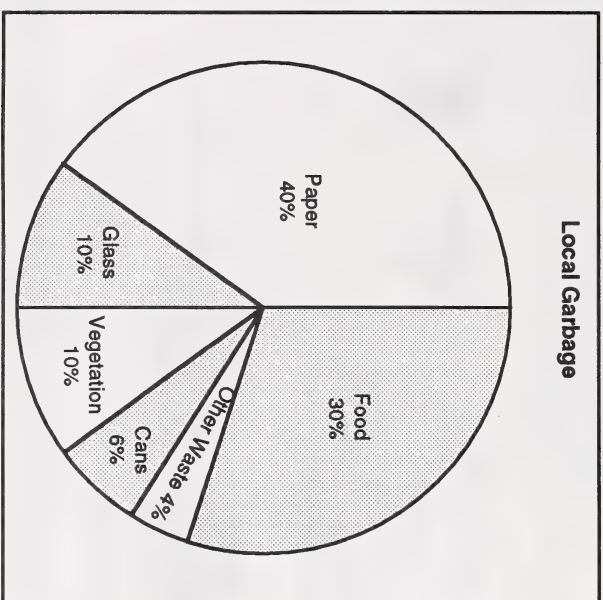
a. Of which kind of garbage is there the most?   1. a. paper

b. How many times as much paper is thrown out as   b. four times
    vegetation?

c. In 1t (1000 kg) of garbage, how many kilograms are there of each of the following types of garbage?

    (i) glass

    (ii) cans

    (iii) paper

d. If people could reuse the paper, the glass, and the cans, how much out of every 1000 kg would have to be thrown away?

c.   (i)   10% of 1 000
          = 0.1 × 1 000
          = 100

In 1t, there are 100 kg of glass.

    (ii)   6% of 1 000
          = 0.06 × 1 000
          = 60

In 1t, there are 60 kg of cans.

    (iii)   40% of 1 000
          = 0.4 × 1 000
          = 400

In 1t, there are 400 kg of paper.

d.   40 + 10 + 6 = 56

    56% of 1 000
    = 0.56 × 1 000
    = 560

In 1t, 560 kg could be reused.

1 000 − 560 = 440

In 1t, 440 kg would have to be thrown away.

2. Use the graph to answer the questions on the next page.

Canada's Production of Wheat (1986)[1]

Saskatchewan
$18 800 000

Alberta
$7 325 000

Others $1 275 000

Manitoba
$4 450 000

---
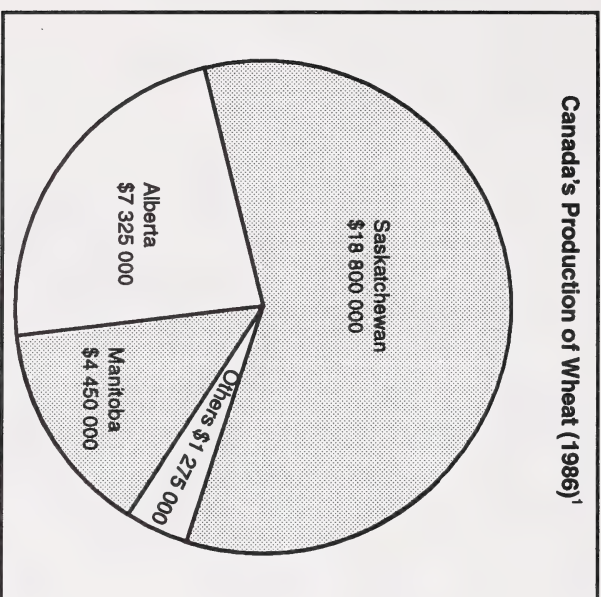
[1] Statistics Canada.

a. Which province produced the most wheat in 1986?

2. a. Saskatchewan

b. About what percent of the total production of wheat was
    produced in each province in 1986?

    b. 18 800 000 + 1 275 000 +
        4 450 000 + 7 325 000 = 31 850 000

    (i) Saskatchewan

        (i) $\frac{18\,800\,000}{31\,850\,000} = \frac{s}{100}$

             $s \doteq 59$

             About 59% was produced in Saskatchewan.

    (ii) Alberta

        (ii) $\frac{7\,325\,000}{31\,850\,000} = \frac{a}{100}$

             $a \doteq 23$

             About 23% was produced in Alberta.

    (iii) Manitoba

        (iii) $\frac{4\,450\,000}{31\,850\,000} = \frac{m}{100}$

             $m \doteq 14$

             About 14% was produced in Manitoba.

Computer Alternative

3. For more practice estimating percents on a circle graph, do "Pie Graphics" on *Disk C of MAC 7* (Houghton Mifflin).

3. Computer corrected

Practice Activities

1. George Grant's net income each month is $2000. Here's how he budgets the money.

Expenses	Cost
Mortgage and property taxes	$780
Food	$540
Clothing	$180
Medical	$160
Transportation	$100
Personal care	$60
Gifts and entertainment	$120
Household maintenance	$60
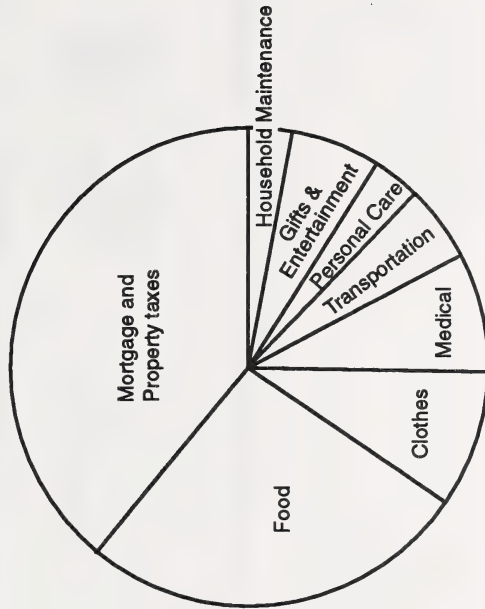
Draw a circle graph to illustrate this data.

Suggested Answers

1.

George Grant's Budget

2. A package of cereal contains the following nutritional information.

Per Serving	
Nutrients	**Mass**
Protein	4.6 g
Fat	1.7 g
Sugar	13.5 g
Dietary Fibre	8.2 g

A serving is 28 g. Construct a circle graph to show the amount of each nutrient in a serving of the cereal.

2.

A Serving of Cereal

MISLEADING GRAPHS

What Lies Ahead

In this section the student will learn these skills.

- recognizing graphs that are used to misrepresent data

Gathering Materials
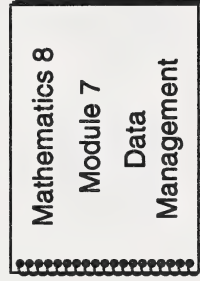
For this section the student will need these items.

Mathematics 8
Module 7
Data
Management

Guiding the Student

- Emphasize to the students the goal of this section.

- Help the students decide what to do in this section.

- Help the students check their answers to the activities in this section and correct any errors.

Practice Activities

1. Explain why the following graphs are misleading. Then redraw the graphs more realistically.

a.

Preferred Pizza Toppings on June 5

40	54	65	90

Anchovies   Mushrooms   Ham   Pepperoni

b.

Preferred Pizza Toppings on June 5

100
90
80
70
60
50
40

Anchovies   Mush-   Ham   Pepperoni
            rooms
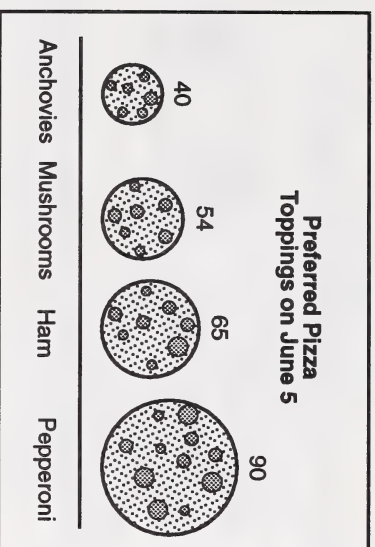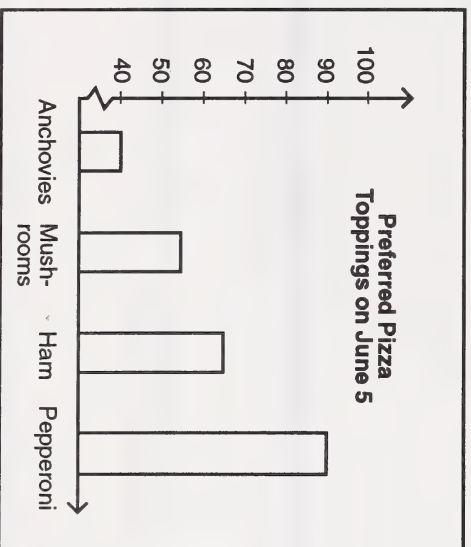
Suggested Answers

1. a. Instead of using a picture to represent 10 pizzas, different-sized pictures are used.

The number of people who prefer pepperoni to the number of people who prefer anchovies is 2.25 to 1. However, the picture representing the people who prefer pepperoni is twice as wide and twice as high, so it appears much greater.

b. Because the scale on the vertical axis is broken, the height of the bars are out of proportion.

The pepperoni bar should be 2.5 times the anchovies bar. Instead it is 6 times higher.

2. Find examples of graphs that are misleading in newspapers and magazines. Explain why they are misleading.

2. Answers will vary.

DATA COLLECTION

What Lies Ahead

In this section the student will learn these skills.

- interpreting a population and census methods
- interpreting a sample and sampling methods
- estimating properties of a population from sample results

Gathering Materials

For this section the student will need these items.

Mathematics 8
Module 7
Data
Management
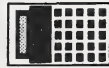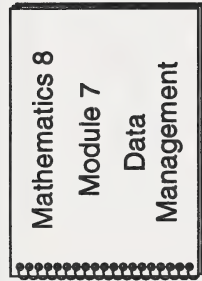
(optional)

- *MATHWORKS: Sampling* (AIT)

- *SOLVE IT: Sampling* (AIT)

Guiding the Student

- Emphasize to the students the goal of this section.

- Help the students decide what to do in this section.

- Help the students check their answers to the activities in this section and correct any errors.

Introductory Activities

For each of the following, name the population and the property of the population that is being counted or measured. Then explain how a census could be conducted.

1. Mia wants to know how many of the children at the elementary school in her town come to school without eating breakfast.

2. Ralph wants to know how many earthworms there are in his garden.
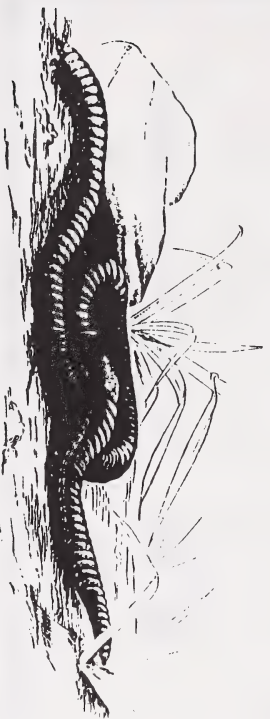
Suggested Answers

1. The population is the children at the elementary school in Mia's town. The property being counted is the number of elementary children who come to school without eating breakfast.

   Answers will vary on how the census could be conducted, but the answers must state that all elementary children are counted. Interviews or questionnaires could be conducted.

2. The population is the earthworms in Ralph's garden. The property being counted is the number of earthworms. Answers will vary on how the census could be conducted. One way is to divide the garden into squares, dig up each square, and count the earthworms.

3. Research the census of Canadians that is held every five years.

a. How is it conducted?

b. How much money does a census cost?

c. Why is the census necessary? What is done with the information obtained?

d. Is the census 100% accurate? Why or why not?

3. a. Census takers drop off questionnaires at every household in Canada before census day. They return after census day and collect the questionnaires. The results are entered into computers.

b. Answers will vary, depending on the year researched. In 1991 the census cost over $250 000 000.

c. The figures are used to determine electoral boundaries, federal payments to the provinces, provincial payments to cities, and to formulate social and economic policies and in planning for schools, hospitals, and transportation systems.

d. Although the census is quite accurate, it is not 100% accurate. Some households are missed and not all homeless people are counted.

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Practice Activities

For each of the following, explain why the sample is biased.

1. Interviews were conducted with people randomly leaving or entering a swimming pool to determine how many people in the community can swim.

2. A questionnaire was handed out to students randomly selected from Hilcrest Junior High School to measure the popularity of a new video game among the teenagers in the community.

3. A telephone poll was conducted by telephoning people whose numbers were randomly chosen from the Calgary telephone book to determine the number of unemployed workers in Calgary.

Suggested Answers

1. The sample is biased because each person in the population does not have an equal chance of being chosen. People entering or leaving a swimming pool are probably swimmers.

2. The sample is biased because each person in the population does not have an equal chance of being chosen. Only students from one junior high school are questioned.

3. Not every person in Calgary has a telephone, so the sample is biased.

4. A newspaper printed a survey form and counted the responses that were returned to determine their readership's attitude to capital punishment.

4. When survey forms are returned voluntarily, the results are often biased. People who feel strongly on one side of the issue or another may reply, but others may not.

5. The population of bighorn sheep in Alberta was estimated by dividing the province into sections of 1 km^2 and then randomly selecting 500 of these sections to form a sample.

5. The bighorn sheep only lives in certain areas of the province. The sections drawn at random may not include any bighorn sheep. It would be preferable to divide the regions where the bighorn sheep live into regions and then take samples.

6. At a dinner party the hostess asked every second guest at the table their preference of after-dinner activities.

6. At dinner parties, people often sit in a male, female, male pattern. By asking every second person, only the men or only the women could be polled.

Concluding Activity

1. Sarah Wury picked 15 potatoes from 3 hills chosen at random on her farm. How many potatoes will there be in 60 hills.

2. Jackson randomly asks 2 people in a community of 832 if they can swim. He reports that 50% of the community can swim. Is this accurate? Why or why not?

Suggested Answers

1. $\frac{15}{3} = \frac{x}{60}$

    $x = 300$

    There are probably 300 potatoes in the 60 hills.

2. No, the sample is too small to give accurate results.

3. Randy checks a random sample of 25 tires in every batch of 1000. If 2 tires in the sample are defective, how many in the batch are likely to be defective?

3. $\dfrac{2}{25} = \dfrac{x}{1000}$

$x = 80$

In the batch, 80 are likely to be defective.

SUMMARY

What Lies Ahead

In this section the student will review these skills.

- keeping tallies and making frequency tables
- constructing and interpreting pictographs, bar graphs, line graphs, and circle graphs
- recognizing misleading graphs
- distinguishing between a population and a sample
- recognizing a biased sample

Gathering Materials

For this section the student will need these items.

Mathematics 8

Module 7

Data

Management
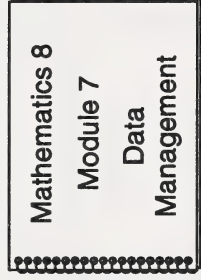
geometry set

Guiding the Student

- Emphasize to the students the goal of this section is to review the module.

- Help the students check their answers to the pretest in Section 1 and correct any errors.

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MODULE CONCLUSION

Gathering Materials

The student will need the following items.

Mathematics 8
Module 7
Data
Management

Assignment
Booklet

What Lies Ahead

The student is now ready to do the assignment in the Assignment Booklet. The student will be graded on the work done in this booklet.
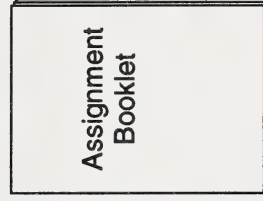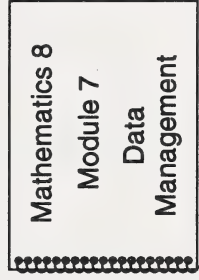
Guiding the Student

- Have the student complete the module assignment independently. The student may use resource material, but cannot get help. The student should attempt all parts of the assignment.

- Afterwards, you should both complete the declaration. You should submit the Assignment Booklet for a grade and feedback.

COURSE SURVEY FOR MATHEMATICS 8

Please evaluate this course and return this survey with your last module assignment. This is a new course designed in a new distance-learning format, so we are interested in your responses to it. Your constructive comments will be greatly appreciated so that a future revision may incorporate any necessary improvements.

Name		Course
Address		Age ☐ under 19
		☐ 19 to 40
		☐ over 40
File No.		Date

Design

1. This course contains a series of module booklets and assignment booklets. Do you like the idea of separate booklets?

   _____

   _____

2. Have you ever enrolled in a correspondence course before that arrived as one large volume?

   ☐ Yes   ☐ No   If yes, which style do you prefer?

   _____

   _____

3. The module booklets contained a variety of self-assessed activities. Did you find it helpful to be able to check your work and have immediate feedback? ☐ Yes   ☐ No   If yes, explain.

   _____

   _____

Name of School	_____
Name of Student	_____
Date	_____
Student I.D. #	_____

4. Were the questions and directions easy to understand? ☐ Yes ☐ No   If no, explain.

_____

_____

5. Each section contains a variety of activities.

   Did you find these activities beneficial? ☐ Yes ☐ No   If no, explain.

_____

_____

6. Did you understand what was expected in the assignment booklets? ☐ Yes ☐ No   If no, explain.

_____

_____

7. The course materials were designed to be completed by students working independently at a distance. Were you always aware of what you had to do? ☐ Yes ☐ No   If no, provide details.

_____

_____

Name of School _____ Date _____

Name of Student _____ Student I.D. # _____

Course Content

1. What is your overall impression of the course? Did it meet your expectations?

_____

_____

2. Did you find the work load reasonable? ☐ Yes ☐ No   If no, explain.

_____

3. Did you have any difficulty with the reading level? ☐ Yes ☐ No   Please comment.

_____

4. How would you assess your general reading level?

poor reader _____ average reader _____ good reader _____

5. Was the material presented clearly and with sufficient depth? ☐ Yes ☐ No
If no, explain.

_____

_____

8. Suggestions for audiocassette and videocassette activities are included in the course. Were you able to use these media options? ☐ Yes ☐ No   Comment on the lines below.

Name of Student _____	Student I.D. # _____
Name of School _____	Date _____

General

1. What did you like least about the course?

_____

_____

2. What did you like most about the course?

_____

_____

Additional Comments

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Only Students Enrolled with the Alberta Distance Learning Centre Complete the Remaining Questions

1. Did you contact Alberta Distance Learning Centre for help or information while doing your course? ☐ Yes ☐ No   If yes, approximately how many times? _____

   Did you find the staff helpful? ☐ Yes ☐ No   If no, explain.

   _____

   _____

2. Were you able to fax any of your assignments? ☐ Yes ☐ No   If yes, comment on the value of being able to do this.

   _____

   _____

3. If you were mailing your assignments, how long was it taking for assignment booklets to return?

   _____

   _____

4. Was the feedback you received from your correspondence teacher helpful? ☐ Yes ☐ No
   Please comment.

   _____

   _____

   _____

Thanks for taking the time to complete this survey. Your feedback is important to us.

Instructional Design and Development Unit
Alberta Distance Learning Centre
Box 4000
Barrhead, Alberta
T0G 2P0

Fax Number: 674-6588

Name of School _____

Date _____

Name of Student _____

Student I.D. # _____